LISTING OF THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claim 1 (Currently Amended)

A plating apparatus comprising:

a plating section for performing a plating process with the use of a plating liquid for plating a substrate with copper, the plating section having an insoluble anode;

a copper dissolution tank connected to the plating section for communication of the plating liquid with the plating section and accommodating therein a copper supply source composed of a copper wire; and

a first circulation mechanism for circulating the plating liquid through the plating section and the copper dissolution tank;

~~wherein the first circulation mechanism circulates the plating liquid between the copper dissolution tank and the plating liquid container so as to supply copper ions into the plating liquid;~~

wherein the plating section comprises:

a plurality of plating vessels for containing the plating liquid to be brought into contact with the substrate;

a plating liquid container capable of containing the plating liquid in a greater amount than the plurality of plating vessels; and

a second circulation mechanism for circulating the plating liquid through the plurality of plating vessels and the plating liquid container,

wherein the copper dissolution tank is connected to the plating section via the plating liquid container;

wherein the first circulation mechanism circulates the plating liquid between the copper dissolution tank and the plating liquid container so as to supply copper ions into the plating liquid;

wherein the copper dissolution tank comprises a cartridge accommodating therein the copper supply source, and having a plating liquid inlet port for introducing the plating liquid, and a plating liquid outlet port for discharging the plating liquid, the cartridge being detachable from the plating apparatus; and

wherein the cartridge includes an outer pipe comprising a side wall thereof, one end of the outer pipe being closed, and a connection member for connecting pipes to the plating liquid inlet port and plating liquid outlet port being connected to an end opposite from the one end of the outer pipe.

Claim 2 (Canceled)

Claim 3 (Original)

A plating apparatus as set forth in claim 1, wherein the copper supply source comprises a plurality of mesh members each prepared by weaving a copper wire, the mesh members being stacked one on another along a flow path of the plating liquid in the copper dissolution tank.

Claim 4 (Canceled)

Claim 5 (Previously Presented)

A plating apparatus comprising:

a plating section for performing a plating process with the use of a plating liquid for plating a substrate with copper, the plating section having an insoluble anode;

a copper dissolution tank connected to the plating section for communication of the plating liquid with the plating section and accommodating therein a copper supply source;

a circulation mechanism for circulating the plating liquid through the plating section and the copper dissolution tank;

a replacement liquid supplying section for supplying a replacement liquid into the copper dissolution tank, for prevention of deterioration of a surface of the copper supply source; and

a control section which performs a control operation to circulate the plating liquid through the plating section and the copper dissolution tank when the plating process is performed in the plating section and to stop the circulation of the plating liquid and replace the plating liquid in the copper dissolution tank with the replacement liquid supplied from the replacement liquid supplying section after completion of the plating process in the plating section;

wherein the control section performs a control operation to replace the plating liquid in the copper dissolution tank with the replacement liquid so as to prevent the concentration of copper ions in the plating liquid from increasing.

Claim 6 (Original)

A plating apparatus as set forth in claim 5, further comprising a deionized water supplying section for supplying deionized water into the copper dissolution tank, wherein the control section performs a control operation so as to replace the plating liquid in the copper dissolution tank with deionized water and then replace the deionized water with the replacement liquid after the completion of the plating process in the plating section.

Claim 7 (Original)

A plating apparatus as set forth in claim 5, wherein the copper supply source comprises a plurality of mesh members each prepared by weaving a copper wire, the mesh members being stacked one on another along a flow path of the plating liquid in the copper dissolution tank.

Claim 8 (Original)

A plating apparatus as set forth in claim 5, wherein the copper dissolution tank comprises a cartridge accommodating therein the copper supply source, and having a plating liquid inlet port for introducing the plating liquid and a plating liquid outlet port for discharging the plating liquid, the cartridge being detachable from the plating apparatus.

Claim 9 (Currently Amended)

A plating apparatus comprising:

a plating section for performing a plating process with the use of a plating liquid for plating a substrate with copper, the plating section having an insoluble anode;

a plurality of copper dissolution tanks connected to the plating section for communication of the plating liquid with the plating section and each accommodating therein a copper supply source;

a circulation mechanism for circulating the plating liquid through the plating section and the copper dissolution tanks;

a weight measuring section for individually measuring weights of the copper dissolution tanks;

a control section which performs a control operation so as to select at least one of the copper dissolution tanks for use in the plating process on the basis of the result of the measurement performed by the weight measuring section and circulate the plating liquid through the selected copper dissolution tank and the plating section; and

wherein the copper dissolution tanks each comprise a cartridge accommodating therein the copper supply source, and having a plating liquid inlet port for introducing the plating liquid, and a plating liquid outlet port for discharging the plating liquid, the cartridge being detachable from the plating apparatus; and

wherein the cartridge includes an outer pipe comprising a side wall thereof, one end of the outer pipe being closed, and a connection member for connecting pipes to the

plating liquid inlet port and plating liquid outlet port being connected to an end opposite from the one end of the outer pipe.

Claim 10 (Original)

A plating apparatus as set forth in claim 9, wherein the control section calculates weights of the copper supply sources in the respective copper dissolution tanks on the basis of the result of the measurement performed by the weight measuring section, and select one of the copper dissolution tanks having the lightest copper supply source for use in the plating process.

Claim 11 (Original)

A plating apparatus as set forth in claim 9, wherein the copper supply source comprises a plurality of mesh members each prepared by weaving a copper wire, the mesh members being stacked one on another along a flow path of the plating liquid in each of the copper dissolution tanks.

Claims 12-35 (Canceled)

Claim 36 (Currently Amended)

A plating apparatus comprising:

a plating section comprising a plating vessel for containing a plating liquid to be brought into contact with a to-be-treated substrate, the plating vessel having an insoluble anode disposed therein for electrical energization of the plating liquid, and a plating liquid container capable of containing the plating liquid in a greater amount than the plating vessel for circulating the plating liquid through the plating vessel and the plating liquid container; and

a copper dissolution tank densely filled with a copper supply source for supplying copper ions to the plating liquid for use in the plating section;

wherein the copper supply source is generally uniformly dissolvable over the entire surface thereof at a constant dissolution rate in the plating liquid, and is configured so that the surface area thereof is changed by a percentage of not greater than 25 % as observed from the start of the dissolution of the copper supply source in the plating liquid till the copper supply source is dissolved to have a shape which is no longer generally conformable to an initial shape thereof;

the copper dissolution tank comprises a cartridge accomodating therein the copper supply source, and having a plating liquid inlet port for introducing the plating liquid, and a plating liquid outlet port for discharging the plating liquid, the cartridge being detachable from the plating apparatus, and

the cartridge includes an outer pipe comprising a side wall thereof, one end of the outer pipe being closed, and a connection member for connecting pipes to the plating liquid inlet port and plating liquid outlet port being connected to an end opposite from the one end of the outer pipe.

Claim 37 (Currently Amended)

A plating apparatus comprising:

a plating section comprising a plating vessel for containing a plating liquid to be brought into contact with a to-be-treated substrate, the plating vessel having an insoluble anode disposed therein for electrical energization of the plating liquid, and a plating liquid container capable of containing the plating liquid in a greater amount than the plating vessel for circulating the plating liquid through the plating vessel and the plating liquid container; and

a copper dissolution tank densely filled with a copper supply source for supplying copper ions to the plating liquid for use in the plating section, and constructed so that the plating liquid flows along a predetermined flow path in the copper dissolution tank;

wherein the copper supply source comprises a copper supply source pipe disposed generally parallel to the flow path and having a pipe interior wall surface and a pipe exterior wall surface generally parallel to the flow path;

the copper dissolution tank comprises a cartridge accomodating therein the copper supply source, and having a plating liquid inlet port for introducing the plating liquid, and a plating liquid outlet port for discharging the plating liquid, the cartridge being detachable from the plating apparatus, and

the cartridge includes an outer pipe comprising a side wall thereof, one end of the outer pipe being closed, and a connection member for connecting pipes to the plating liquid inlet port and plating liquid outlet port being connected to an end opposite from the one end of the outer pipe.

Claim 38 (Currently Amended)

A plating apparatus comprising:

a plating section comprising a plating vessel for containing a plating liquid to be brought into contact with a to-be-treated substrate, the plating vessel having an insoluble anode disposed therein for electrical energization of the plating liquid, and a plating liquid container capable of containing the plating liquid in a greater amount than the plating vessel for circulating the plating liquid through the plating vessel and the plating liquid container; and

a copper dissolution tank densely filled with therein a copper supply source for supplying copper ions to the plating liquid for use in the plating section, and constructed so that the plating liquid flows along a predetermined flow path;

wherein the copper supply source comprises a copper supply source plate disposed generally parallel to the flow path and having a pair of surfaces generally parallel to the flow path,

the copper dissolution tank comprises a cartridge accomodating therein the copper supply source, and having a plating liquid inlet port for introducing the plating liquid, and a plating liquid outlet port for discharging the plating liquid, the cartridge being detachable from the plating apparatus, and

the cartridge includes an outer pipe comprising a side wall thereof, one end of the outer pipe being closed, and a connection member for connecting pipes to the plating

liquid inlet port and plating liquid outlet port being connected to an end opposite from the one end of the outer pipe.

Claim 39 (Previously Presented)

A plating apparatus as set forth in claim 5, wherein the replacement liquid prevents contact between the copper supply source and the plating liquid for prevention of deterioration of a surface of the copper supply source.

Claim 40 (Previously Presented)

A plating apparatus as set forth in claim 9, wherein the weight measuring section comprises a weight meter for receiving the copper dissolution tank and wherein the cartridge has one end closed by a bottom plate and another end provided with a pipe connection member.

Claim 41 (New)

A plating apparatus comprising:

a plating section for performing a plating process with the use of a plating liquid for plating a substrate with copper, the plating section having an insoluble anode;

a copper dissolution tank connected to the plating section for communication of the plating liquid with the plating section and accommodating therein a copper supply source composed of a copper wire; and

a first circulation mechanism for circulating the plating liquid through the plating section of the copper dissolution tank;

wherein the copper dissolution tank comprises a cartridge accommodating therein the copper supply source, and having a plating liquid inlet port for introducing the plating liquid, and a plating liquid outlet port for discharging the plating liquid, the cartridge being detachable from the plating apparatus, and

wherein the cartridge includes an outer pipe comprising a side wall thereof, one end of the outer pipe being closed, and a connection member for connecting pipes to the plating

liquid inlet port and plating liquid outlet port being connected to an end opposite from the one end of the outer pipe.

Claim 42 (New)

A plating apparatus as set forth in claim 1,

wherein the cartridge further includes an inner pipe provided in the outer pipe,

wherein the end of the inner pipe adjacent to the connection member serves as the plating liquid inlet port,

and wherein the plating liquid outlet port is provided at an end of a space between the inner pipe and the outer pipe adjacent to the connection member.